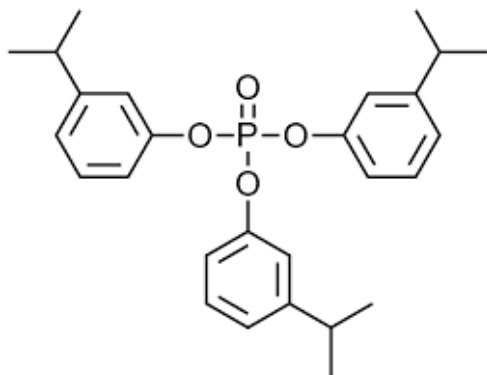


CAS 68937-41-7

Isopropylated triphenyl phosphate (IPTPP)

$C_{27}H_{33}O_4P$



Summary of Health Effects

IPTPP may harm fertility, cause changes in reproductive organs or damage the nervous system, based on animal studies.

How is IPTPP used?

IPTPP is used as a plasticizer and flame retardant. It has been used in Europe in polyurethanes, polyvinyl chloride (PVC) products, textile coatings, paints, adhesives, and pigment dispersions.¹ An isomeric mixture of phosphate esters makes up IPTPP and may vary in composition.^{2,3} IPTPP is also a component of the commercial flame retardant mixture Firemaster 550, which is widely used in flexible polyurethane foam as a flame retardant.⁴ Firemaster 550 that contains IPTPP has been detected in children's products.^{5,6,7}

Toxicity: What are its health effects?

IPTPP is characterized by the U.S. Environmental Protection Agency (EPA) as a high hazard for reproductive toxicity based on studies of rats fed IPTPP, which reported reduced fertility and altered epididymal and ovarian weights.² IPTPP has been designated by the European Union as a category 2 reproductive hazard, and "suspected of damaging fertility and the unborn child."¹ IPTPP

is characterized by the EPA as a high hazard for developmental and neurological toxicity based on the toxicity of structurally similar analogs.²

Pregnant rats fed IPTPP showed decreased fertility and pup survival. Neurological effects, such as brain cholinesterase inhibition, occurred in rodents fed a commercial mixture of IPTPP.² Hens fed IPTPP over 91 days showed ataxia and degeneration of the spinal cord and peripheral nerves.⁸ A 2016 *in vitro* study by reported a significant increase in steroid production and basal progesterone production in mouse tumor Leydig cells exposed to IPTPP.⁹

Exposure: How can a person come in contact with it?

A person may come in contact with IPTPP by breathing in, eating, or skin contact with contaminated dust, or from skin contact with consumer products containing IPTPP.

The mean total daily intake of IPTPP was 0.1 ng/kg body weight for infants, 0.7 ng/kg for toddlers, 0.2-0.4 ng/kg for ages 14-16 and 0.4-0.8 ng/kg body weight for adults according to 1982-1984 U.S. total diet studies.⁷ A 1994 study detected IPTPP in U.S. vegetation, wastewater,

surface water and sediment.¹⁰ A 1999 study detected IPTPP in the soil at two U.S. Air Force bases.¹¹

estimated bioaccumulation factor values, experimental bioconcentration factor values and a moderate persistence in biodegradation studies.²

IPTPP is characterized by the EPA to have a high potential for bioaccumulation based on

References

1. European Chemicals Agency. REACH Registration Dossier--Phenol, isopropylated, phosphate (3:1). Classification & Labelling. Retrieved from echa.europa.eu/registration-dossier/-/registered-dossier/13333/2/1
2. U.S. Environmental Protection Agency (2015). *Flame retardants used in flexible polyurethane foam: An alternatives assessment update*. U.S. Environmental Protection Agency. Retrieved from www.epa.gov/sites/production/files/2015-08/documents/ffr_final.pdf
3. UK Environment Agency (2009). *Environmental risk evaluation report: Isopropylated triphenyl phosphate (CAS nos. 28108-99-8, 26967-76-0 & 68937-41-7)*. Bristol, United Kingdom. Retrieved from assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/290854/scho0809bq-ug-e-e.pdf
4. Stapleton, H.M., Klosterhaus, S., Keller, A., Ferguson, P.L., van Bergen, S., Cooper, E., et al. (2011). Identification of flame retardants in polyurethane foam collected from baby products. *Environmental Science & Technology*, 45(12), 5323–5331.
5. Washington Department of Ecology (2014). *Flame retardants in general consumer and children's products*. (Publication No. 14-04-021). Washington Department of Ecology. Retrieved from fortress.wa.gov/ecy/publications/SummaryPages/1404021.html
6. Stapleton, H.M., Sharma, S., Getzinger, G., Ferguson, P.L., Gabriel, M., Webster, T.F., et al. (2012). Novel and high volume use flame retardants in US couches reflective of the 2005 pentaBDE phase out. *Environmental Science & Technology*, 46(24), 13432–13439.
7. Gunderson, E.L. (1995). FDA Total Diet Study, July 1986-April 1991, dietary intakes of pesticides, selected elements, and other chemicals. *Journal of AOAC International*, 78(6), 1353-1363.
8. EPA (2016). *ChemView file for CAS No. 68937-41-7*. Environmental Protection Agency. Retrieved from java.epa.gov/chemview
9. Schang G., Robaire, B., & Hales, B.F. (2015). Organophosphate flame retardants act as endocrine-disrupting chemicals in MA-10 mouse tumor leydig cells. *Toxicological Sciences*, 150(2), 499–509.
10. Boethling, R.S. & Cooper, J.C. (1985). Environmental fate and effects of triaryl and trialkyl/aryl phosphate esters. *Residue Reviews*, 94, 49-99.
11. David, M.D., Seiber, J.N. (1999). Analysis of organophosphate hydraulic fluids in US Air Force base soils. *Archives of Environmental Contamination and Toxicology*, 36:235-241.